

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the Application of: )  
 )  
ASHIDA et al ) Group Art Unit:  
 )  
Serial No.: ) Examiner:  
(Division of U.S.S.N. 09/303,498 )  
filed: April 30, 1999) )  
 )  
Filed: November 15, 2001 )  
 )  
For: VEHICLE SEAT, A SKIN MATERIAL )  
FOR VEHICLE SEAT AND A METHOD )  
OF MANUFACTURING THE VEHICLE )  
SEAT )

PRELIMINARY AMENDMENT

Assistant Commissioner for Patents  
Washington, D.C. 20231

Sir:

Please amend the captioned application as follows:

IN THE SPECIFICATION & ABSTRACT:

Please substitute the attached Substitute Specification & Abstract for the originally filed Specification.

IN THE SUBSTITUTE SPECIFICATION:

Page 1, between lines 3 and 4, insert the following paragraph:

T0911T 0092860

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--This application is a division of U.S.S.N. 09/303,498 filed April 30, 1999 and allowed September 21, 2001.--

Please rewrite the paragraph at page 10, lines 8-11 as follows:

--Further, since the closed-cell cellular material 14 is present between the PVC layer 12 of the skin material 10 and the cushioning material 20, the plasticizer contained in the PVC layer 12 cannot migrate through the substrate fabric 13 to the cushioning material 20, thereby preventing degradation of the cushioning material 20.--

Please change the paragraph at page 22, line 17 to page 23, line 1 to read as follows.

--Alternatively, adhesive 40 may be coated on skin material 10 molded into a concave/convex shape in a mold frame and then the skin charged with a starting precursor for urethane foam and molding the same by framing.--

IN THE CLAIMS:

Please cancel claims 1-12 and rewrite claims 13, 14 and 15 as follows:

13. (Amended) A method of manufacturing a vehicle seat comprising:

providing a cushioning material having a ridge defining a seating area;

coating an adhesive on at least one the seating area of the cushioning material and a first portion of a skin material disposed to cover the seating area;

covering the cushioning material with the skin material;  
press-bonding the skin material to the cushioning material; and  
securing a peripheral edge of the skin material to the seat.

14. (Amended) A method of manufacturing a vehicle seat as defined in claim 13, wherein the method further comprises:

vacuum forming the skin material into a three-dimensional shape prior to said coating.

15. (Amended) A method of manufacturing a vehicle seat as defined in claim 13 further comprising:

forming the skin material by joining the first portion of the skin material and a second portion of skin material, for covering portions of cushioning material outside of the seating area, said joining forming a joining line;

forming a concave groove in the cushioning material at a predetermined position including the joining line, on the seating area side of the ridge; and

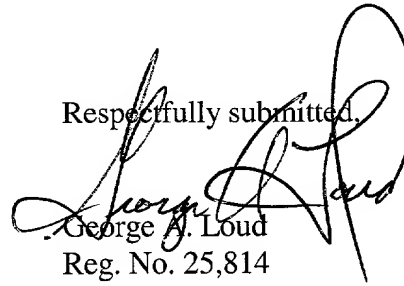
covering over the cushioning material with a water proof film and then cutting off the water proof film along the concave groove so that no water proof film remains within the seating area.

#### REMARKS

A "Substitute Specification and Abstract" is submitted herewith in order to place the case

in better idiomatic English form. It has been noted that the case as originally filed did not include an Abstract. The "Substitute Specification and Abstract" submitted herewith contains no new matter. In order that the examiner can satisfy himself in this regard, also submitted herewith is a marked-up copy of the original specification, from which the "Substitute Specification" was typed.

Respectfully submitted,



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Dated: November 15, 2001

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Amendments to Specification

In the substitute specification, please rewrite the paragraph at page 10, lines 8-11 as follows:

--Further, since the closed-cell cellular material 14 is present between the PVC layer 12 of the skin material 10 and the cushioning material 20, the plasticizer contained in the PVC layer 12 cannot migrate through the substrate fabric 13 to the cushioning material 20, thereby preventing degradation of the cushioning material 20.--

Please change the paragraph at page 22, line 17 to page 23, line 1 to read as follows.

--Alternatively, adhesive 40 may be coated on skin material 10 molded into a concave/convex shape in a mold frame and then the skin [then] charged with a starting precursor for urethane foam and molding the same by framing.--

Amendments to Claims

13. (Amended) A method of manufacturing a vehicle seat comprising: [in which a cushioning material is covered with a skin material, wherein the method comprises;]

providing a cushioning material having a ridge defining a seating area;

[a step of] coating an adhesive on [to] at least one the [of a region inward of a ridge for a] seating area of the cushioning material and a first portion of a skin material disposed to cover [a region inward of the ridge for] the seating area; [of the cushioning material,]

[a step of] covering the cushioning material with the skin material; [to the cushioning material,]

[a step of] press-bonding the skin material to [and] the cushioning material; [,] and

securing a [step of applying a treatment to the] peripheral edge [end] of the skin material to the seat.

14. (Amended) A method of manufacturing a vehicle seat as defined in claim 13, wherein the method further comprises: [;]

[a step of] vacuum forming the skin material into a three-dimensional shape [,] prior to said [a step of] coating [an adhesive to at least one of the region inward of the ridge for the seating area of the cushioning material and the skin material disposed to the region inward of the ridge for the seating area of the cushioning material, and

a step of vacuum forming the skin material].

15. (Amended) A method of manufacturing a vehicle seat as defined in claim 13 further comprising [, wherein the method comprises the steps of]:

forming the skin material by joining the first portion of the [a] skin material [including the region of the seating area] and a second portion of skin material, for covering portions of cushioning material outside [not including the region] of the seating area, said joining forming a joining line;

forming a concave groove in the cushioning material at a predetermined position including the [a] joining line, [for joining the skin materials] on the seating area side of the ridge [for the cushioning material from the joining line to a region of the seating area]; [,] and

covering [a water proof film] over the cushioning material with a water proof film and then cutting off the water proof film along the concave groove so that no water proof film remains within the seating area.

## Title of the Invention

VEHICLE SEAT, A SKIN MATERIAL FOR A VEHICLE  
SEAT AND A METHOD OF MANUFACTURING THE VEHICLE  
SEAT

## Background of the Invention

## 1. Field of the Invention

The present invention concerns a vehicle seat and, particularly, it relates to a vehicle seat used in outdoors and a method of manufacturing a vehicle seat, which has good finishing, <sup>good</sup> high physical properties, durability and weather <sup>resistance</sup> proofness and <sup>which</sup> can be manufactured efficiently, as well as a skin material for the vehicle seat and a method of manufacturing the vehicle seat.

## 2. Statement of the Related Art

A vehicle seat has been formed, for example, by disposing a cushioning material on a bottom plate and covering them with a skin material. For the vehicle seat, a seat of a concave/convex shape has been proposed particularly in view of aesthetic <sup>and comfort</sup> design or convertible <sup>in</sup> feeding upon riding. For example, a method of using a tack last technique for forming the concave/convex portion <sup>and the</sup> or a method of covering a cushioning material with a skin material by stitching <sup>have</sup> has been <sup>used</sup> known for the method of



in manufacturing [the] seat of [the] concave/convex shape.

In the tack last method, as shown in Fig. 10, a concave line is formed to a cushioning material 120 and a skin material 110 is tack lasted by a tack last means (tack last string) 140 to a bottom plate 130.

The tack last seat described above involves a problem<sup>in</sup> that a distinct feeling for the concave/convex shape can not be obtained when the concave line forms a complicated curve (such as an S-shaped curve) or a three dimensional curve, unless many tack last points are set on every turning point of the curve.

However, if [If] the number of tack last points is increased in order to overcome<sup>the above-described problem, the result is</sup> [this drawback], a dimple-like [state] appearance of [appears locally to] the outer surface [only in the tack last points] to deteriorate the appearance, as well as [less] worsen the efficiency<sup>in</sup> [of] the assembling operation. Further, since the tack last portions<sup>receive</sup> [undergo] concentrated force<sup>s</sup>, the skin material and the tack last means are sometimes detached.

The method of covering a cushioning member 120 with a skin material 110 having the concave/convex shape formed by stitching<sup>suffer from the</sup> [involves a] drawback that [undesirable] separation is caused between<sup>separate</sup> the skin material 120 and the cushioning material 120 at the concave/convex portion, particularly, at the concave portion.

In order to solve the foregoing problem, <sup>3 have been</sup> <sup>applying</sup> <sup>to</sup> a vehicle seat formed by <sup>coating</sup> an adhesive <sup>on</sup> the seating area of the cushioning material and bonding the skin material thereto <sup>has been known</sup>. In this vehicle seat, <sup>the</sup> <sup>an</sup> adhesive is <sup>applied to</sup> <sup>coated</sup> at predetermined portions including ridges of the cushioning material.

However, when a rider sits on the seat, since <sup>the</sup> <sup>a</sup> load <sup>is concentrated</sup> <sup>where</sup> exerts most concentrically on the ridges of the cushioning material, and, if the skin material is secured, <sup>at the</sup> <sup>is exerted</sup> ridges to the cushioning material, excessive force <sup>exerts</sup> on the skin material to undesirably flex or crease the seat.

Further, in <sup>the</sup> <sup>method of</sup> covering the cushioning material 120 with the skin material 110, it is necessary to prevent water <sup>and</sup> <sup>for</sup> dusts from <sup>entering</sup> <sup>intruding</sup> into the cushioning material 120 <sup>through</sup> <sup>joined portions of a</sup> <sup>where the</sup> <sup>plurality of</sup> skin materials 110 <sup>are joined</sup> <sup>stitched</sup> to each other <sup>by stitching</sup>.

For this purpose, a water proof film (not illustrated) is disposed between the skin material 110 and the cushioning material 120 at the stitched portions of the skin material 110 to prevent intrusion of rain water or the like <sup>by the</sup> <sup>water proof film</sup>.

In <sup>the</sup> <sup>method of</sup> using the water proof film described above, it is necessary to dispose the water proof film accurately <sup>for enabling</sup> to prevent water <sup>and</sup> of

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dusts from intruding ~~through the joined portions by~~  
~~situating the water proof film at appropriate positions.~~

Further, in a vehicle seat formed by covering the cushioning material 120 with the skin material 110 by stitching, since ~~separation tends to be caused between~~ the skin material 110 and cushioning material 120 <sup>tend to separate</sup> at the concave/convex portions, particularly, at concave portions, <sup>in one</sup> ~~a method~~ <sup>is applied</sup> ~~of coating~~ an adhesive between the skin material 110 and the cushioning material 120 to prevent separation, ~~has been known.~~

When the adhesive is <sup>applied</sup> ~~coated~~ between the skin material 110 and the cushioning material 120, if the water proof film is not disposed at an appropriate position, the water proof film comes into <sup>the region of the</sup> ~~an~~ adhesive <sup>and become twisted</sup> ~~coating region to~~ ~~suffer from twisting by the deposition of the adhesive,~~ or the water proof film <sup>is</sup> ~~is put~~ between the adhesive and the skin material 110, <sup>with</sup> ~~to interfere~~ the adhesion between the skin material 110 and the cushioning material 120.

Therefore, it is necessary to accurately cut off the water proof film at exact positions, but the operation ~~conducted~~ while confirming the cut off position is <sup>and inefficient</sup> laborious, ~~to result in a problem that the operation can~~ ~~not be conducted efficiently.~~

Further, the vehicle seat is generally formed as an integral cellular molding ~~product~~ comprising a skin

material, a cushioning material and a bottom plate, for example, a polyvinyl chloride skin material and a polyurethane cellular material.

As shown, for example, in Fig. 15 and Fig. 16, the vehicle seat comprises a skin material 110 and a cushioning material 120, and the skin material 110 <sup>includes an</sup> is constituted by applying a surface treating <sup>applied</sup> acrylic material 111 to a synthetic resin 112 or <sup>for a</sup> laminating a synthetic resin 112 <sup>laminated</sup> on a substrate fabric 113, and applying ~~a surface treating material 111 on the synthetic resin 112.~~ Then, the skin material 110 is bonded <sup>to</sup> ~~at~~ the surface of the synthetic resin 112 or the substrate fabric 113 using an adhesive 140 ~~to the cushioning material 120.~~

In the prior art described above, if a polyvinyl chloride skin material is used, for example, as the synthetic resin 112, <sup>an undesirable</sup> it results in a drawback that vinyl resin-like gloss appears on the surface, ~~to lack in a grave~~ ~~feeling~~

Further, contact between the skin material 110 and the cushioning material 120 results in the following disadvantages.

(1) ~~That is,~~ A plasticizer contained in the synthetic resin 112 migrates <sup>and degrades</sup> to the cushioning material 120, ~~to~~ ~~deteriorate the cushioning material.~~

(2) ~~Further,~~ When a plasticizer contained in the

synthetic resin 112 migrates to the cushioning material 120, the amount of the plasticizer contained in the synthetic resin 112 is decreased to make the synthetic resin 112 hard and <sup>to</sup> worsen the feel[ing] upon sitting on the seat.

(3) [Further, an amine catalyst contained in the cushioning material 120 <sup>adversely affects</sup> gives <sup>an effect on</sup> the synthetic resin 112 to cause discoloration or fading <sup>of</sup> in the synthetic resin 112, thereby <sup>detracting from</sup> deteriorating the aesthetic appearance of the vehicle seat.

(4) [Further, <sup>the</sup> if a solvent type adhesive is used as an adhesive 140 for bonding the skin material 110 <sup>to</sup> and the cushioning material 120, <sup>the</sup> a solvent contained in the adhesive migrates to the synthetic resin 112 to discolor the synthetic resin 112.

For overcoming the drawbacks described above, [it has] <sup>has been developed for</sup> been known a method of preventing migration of the plasticizer or the amine catalyst <sup>which method involves placing</sup> by disposing an amide type resin film or a polyethylene type resin film between the skin material and the cushioning material, but this <sup>method</sup> increases the number of <sup>components,</sup> parts to make the manufacturing cost expensive and increase<sup>s</sup> the number of steps.

#### SUMMARY OF THE INVENTION

An object of the present invention is to provide a

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vehicle seat in which a water proof film is disposed accurately at stitched portions of a skin material <sup>[for]</sup> covering a cushioning material and reliably preventing water or dusts <sup>/</sup> from intruding through the stitched portions of the skin material, as well as <sup>to provide</sup> a method of manufacturing such a vehicle seat.

Another object of the present invention is to provide a vehicle seat with <sup>a</sup> preferred finishing <sup>the</sup>, having high durability and capable of being manufactured efficiently, as well as <sup>to provide</sup> a method of manufacturing such a vehicle seat.

A further object of the present invention is to provide a skin material for use in a vehicle seat having a satisfactory appearance, and capable of preventing

<sup>From migrating into the</sup> [migration of] a plasticizer contained in <sup>the</sup> synthetic resin <sup>of the skin</sup> [to a] cushioning material without increasing the number of <sup>components or</sup> [parts and a] number of steps, thereby preventing <sup>an uncomfortable</sup> [worsening] <sup>the</sup> [of] feeling upon sitting on <sup>a</sup> seat and degradation of the cushioning material.

A further object of the present invention is to provide a skin material for use in a vehicle seat free from the worry of discoloration or fading <sup>of</sup> [in] the skin material caused by an amine catalyst contained in <sup>the</sup> cushioning material.

A further object of the present invention is to

provide a skin material for use in a vehicle seat capable of <sup>resisting</sup> preventing discoloration of a skin material caused by migration of a solvent to the skin material when a solvent type adhesive is used for bonding the skin material <sup>to</sup> and the cushioning material.

A still further object of the present invention is to provide a skin material for use in a vehicle seat that can be bonded by high frequency welding.

A still further object of the present invention is to provide <sup>a</sup> a skin material for use in a vehicle seat having <sup>^</sup> satisfactory leather-like feeling, with no loss of comfort degradation due to abrupt shifting of load when a rider sits on the seat and <sup>high resistance to</sup> showing high weather proofness to the weathering

In the present specification, "vehicle seat" includes those seats for land motorcycles <sup>and</sup> or scooters, as well as snow mobiles and water motorcycles and, further, includes vehicle seats for tricycles <sup>and construction</sup> or buggy vehicles, mounting vehicles or building machine seats.

The present invention is to be explained with reference to embodiments based on claims. <sup>Figs 1 and 2 show a</sup> A vehicle seat S of the present invention <sup>in accordance with an embodiment</sup> has a <sup>as including</sup> constitution in which a cushioning material 20 is disposed on a bottom plate 30 and the cushioning material 20 is covered with a skin material 10.

The skin material 10 and the cushioning material 20 are bonded with an adhesive 40 coated <sup>in</sup> to a region 50, inward of a ridge <sup>23, which forms</sup> 12 for a seating area of the cushioning material 20, <sup>excepting</sup> for the top end of the seat. The adhesive 40 is coated <sup>on</sup> to one or both of the skin material 10 and the cushioning material 20.

When the skin material and the cushioning material are bonded by the adhesive in this way, <sup>the adhesive</sup> it suitably facilitates the assembling <sup>of</sup> operation between the cushioning material and the skin material.

Further, since the adhesive is coated <sup>in</sup> to a region inward of the ridge for the cushioning material, the skin material is not secured at the ridge portion <sup>which receives the</sup> undergoing a most localized load, <sup>so that</sup> no excessive force <sup>is</sup> exerts on the skin material, thereby preventing <sup>ing and providing</sup> occurrence of flexion <sup>and</sup> for crease, <sup>to obtain</sup> a vehicle seat of good appearance.

Further, the skin material 10 is formed by joining a skin material 10a <sup>for the</sup> including a seating area and a skin material 10b <sup>surrounding</sup> not including the seating area.

By stitching stitching of a plurality of skin materials in this way it is possible to form a desired concave/convex shape. As shown in Figs. 3 and 4, <sup>along 2</sup> a concave groove 22 is formed <sup>at a predetermined</sup> position including a joining line 10c <sup>for</sup> joining the skin material 10a and the skin material 10b, on the side of the ridge <sup>adjacent</sup> 23 of the cushioning material 20 <sup>from the joining</sup>



[line 10c to a region of the seating area.] Then, a water proof film 21 is disposed between the skin material 10 and the cushioning material 20<sup>and extending</sup> from the skin material 10b [not] ~~including the region of the seating area to the position~~ <sup>to</sup> [for] the concave groove 22.

As described above, in the vehicle seat of this embodiment, since the concave groove is formed at a predetermined position including the joining line on the side of the ridge<sup>adjacent</sup> [of] the cushioning material, [from the] ~~joining line to the region of the seating area,~~ the water proof film can be [disposed simply at an] <sup>appropriately</sup> position<sup>ed</sup> by disposing the water proof film ~~from~~ <sup>against that portion of</sup> the skin material <sup>which surrounds (excludes)</sup> [not including the region of] the seating area to [the position for] the concave groove, with the concave groove <sup>serving</sup> [being] as a guide line.

The skin material 10 comprises a PVC layer 12, a substrate fabric 13 composed of a knitted material and a closed-cell cellular synthetic resin 14, laminated in this order, and an acrylic or vinyl chloride type surface ~~treating~~ material 11 <sup>over</sup> [is] applied <sup>to</sup> the PVC layer 12.

~~[An acrylic or vinyl chloride type surface treating material 11 is applied to the PVC layer 12.]~~

As described above, since the surface ~~treating~~ material 11 is disposed <sup>on the PVC layer 12</sup> [to the skin material 10, an] embossing ~~fabrication~~ can be applied to the surface

[treating] material 11, thereby providing the seat surface with a leather-like feeling [to] to obtain a satisfactory vehicle seat having <sup>good</sup> [grave feeling in view of] appearance.

When a vinyl chloride - acrylate copolymer resin or a vinyl chloride - methacrylate copolymer resin is used as the surface [treating] material 11, [a] high frequency welding can be <sup>used</sup> [applied] to secure the skin materials 10 <sup>to</sup> [with] each other or <sup>to</sup> secure the <sup>periphery of the</sup> skin material 10 [at the peripheral end] thereof to the bottom plate 30 reliably and easily.

The substrate fabric 13 <sup>is a</sup> [composed of] knitted material [is] made of [yarns comprising] at least one of nylon yarns, polyester yarns <sup>and</sup> [or] rayon yarns.

Since the substrate fabric 13 is disposed [in] adjacent [with] the PVC layer 12, when the skin material 10 is pulled, no direct force is applied to the closed-cell cellular material 14 <sup>and</sup> [to prevent] breakage of the closed-cell cellular material 14. <sup>is thereby prevented</sup>

Further, since the closed-cell cellular material 14 is present between the PVC layer 12 <sup>as</sup> [constituting] the skin material 10 and the cushioning material 20, the plasticizer contained in the PVC layer 12 <sup>can not</sup> [no more] migrate through the substrate fabric 13 to the cushioning material 20, thereby ~~enabling to~~ <sup>ing</sup> prevent degradation of the cushioning material 20.

Further, since the closed-cell cellular material 14

is present between the PVC layer 12 and the cushioning material 20, <sup>because</sup> the plasticizer contained in the PVC layer 12 <sup>can not</sup> ~~no more~~ migrates through the substrate fabric 13 to the cushioning material 20, ~~thereby enabling to prevent~~ hardening of the PVC layer due <sup>to a</sup> the decrease of the plasticizer <sup>is</sup> ~~to~~ prevent <sup>ed.</sup> ~~disadvantage that the feeling upon~~ ~~sitting on the seat is worsened.~~

Further, since the closed-cell cellular material 14 is present between the PVC layer 12 and the cushioning material 20, an amine catalyst contained in the cushioning material 20 <sup>can not</sup> ~~no more~~ migrates <sup>into</sup> ~~to~~ the PVC layer 12 to ~~cause it~~ <sup>to</sup> ~~prevent~~ discoloration or fading ~~in the PVC layer 12.~~ In this way, it is possible to prevent ~~the disadvantage of~~ deterioration <sup>of</sup> the aesthetic appearance of the vehicle seat <sup>upon</sup> ~~constant exposure~~ ~~always exposed externally~~ to the weather.

Further, since the cellular material 14 <sup>with 2</sup> ~~of the~~ <sup>structure</sup> closed-cells is present between the PVC layer 12 and the cushioning material 20, a solvent contained in the adhesive for bonding the skin material 10 <sup>to</sup> ~~and~~ the cushioning material 20 <sup>can not</sup> ~~no more~~ migrates <sup>into</sup> ~~to~~ the PVC layer 12 to ~~prevent~~ discoloration ~~of~~ the PVC layer 12.

~~It is suitable that~~ <sup>may suitably be</sup> the closed-cell cellular material 14 ~~is~~ a crosslinked cellular material and, more specifically, a PVC cellular material.

Crosslinked cellular material has heat resistance

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and shows excellent weather resistance when exposed to <sup>temperatures</sup> ~~the~~ broiling ~~weather~~ for a long period of time.

Further, use of the PVC cellular material as the closed-cell cellular material 14 can reliably cover the cushioning material 20 of poor water <sup>resistance</sup> ~~proofness in spite of~~ ~~the laminate structure~~, thereby ~~enabling to~~ ensure ~~the~~ weather <sup>resistance</sup> ~~proofness~~ of the seat. Further, this can provide a satisfactory leather-like feeling ~~to~~ the skin material.

Furthermore, since <sup>the</sup> ~~the~~ lamination ~~of~~ the cushioning closed-cell cellular material 14 on the cushioning material 20 ~~gives a nature of~~ <sup>are</sup> moderating impact shock, ~~shocks to the~~ rider ~~sitting shock is~~ moderated. Furthermore, it ~~also~~ <sup>prevents</sup> ~~provides an effect of causing less~~ degradation by abrupt shifting of load upon sitting <sup>provides</sup> ~~to obtain a~~ high durability.

The skin material 10 may contain a protein material ~~to give~~ <sup>to give</sup> ~~With such a constitution, it provides an effect of making~~ the surface of the vehicle seat <sup>a</sup> ~~not sticky but giving~~ smooth and fresh feeling. <sup>rather than a sticky feeling. Further, the protein</sup> ~~It is possible to prevent~~ undesirable moistened feeling upon sitting, <sup>ure on the seat</sup> ~~and this can~~ facilitate cleaning <sup>a</sup> ~~upon contamination of~~ the seat surface. Furthermore, it also provides <sup>and thereby</sup> ~~an effect of providing~~ moderate gloss to the surface of the seat ~~to improve~~ the aesthetic appearance of the seat.

The method of manufacturing the vehicle seat comprises the following steps.

At first, an adhesive 40 is coated <sup>over an area of the cushioning material 20</sup> to a region inward of <sup>i.e. over</sup> ridge 23, for the seating area of a cushioning material 20. Further, an adhesive 40 is coated on the <sup>area</sup> surface of <sup>which comes into the</sup> skin material 10 in contact with the region inward of the ridge 23, <sup>i.e. with</sup> for the seating area of the cushioning material 20.

Then, the skin material 10 and the cushioning material 20 are press-bonded to cover the cushioning material 20 with the skin material 10.

Alternatively, <sup>it may be adapted</sup> a method of vacuum forming <sup>may be used with the</sup> skin material 10, coating an adhesive 40 <sup>on</sup> to the region inward of the ridge 23, <sup>for</sup> (the seating area) of the cushioning material 20. <sup>then brought into the adhesive coated</sup> The surface of the skin material 10 is in contact with a region inward of the ridge 23 for the seating area of the cushioning material 20, and then press bonding <sup>ed thereto, thereby</sup> ~~the skin material 10 and the cushioning material 20 and~~ covering the cushioning material 20 with the skin material 10.

As described above, by vacuum formation of the skin material, it is possible to cope <sup>even with</sup> the cushioning material of an abrupt concave/convex shape, <sup>thus</sup> to ensure <sup>in</sup> the freedom of the design and the performance.

Alternatively, a concave groove 23 may be formed <sup>in</sup> to a cushioning material 20 on the side facing a skin material 10 <sup>and</sup> at a predetermined position <sup>along</sup> including a

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joining line 10c for the skin material 10, in a region from  
~~the joining line 10c to the seating area.~~

Then, a water proof film 21 is attached to the  
 cushioning material 20. <sup>and</sup> Further, the water proof film 21  
~~is~~ cut off along the concave groove 23.

Then, an adhesive 40 is coated <sup>on</sup> to the surfaces of  
 the cushioning material 20 and the skin material 10 in  
 contact with each other to press-bond the skin material 10  
 and the cushioning material 20. ~~Finally, the cushioning~~  
~~material 20 is covered with the skin material 10.~~

As described above, in the method of manufacturing  
 the vehicle seat according to the present invention, a  
 concave groove is <sup>formed in</sup> ~~disposed to~~ the cushioning material, and  
 the water proof film can be disposed at an appropriate  
 position by merely cutting off the water proof film along  
 the concave groove with the concave groove <sup>serving</sup> ~~being~~ as a  
 guide line, to improve ~~the operation~~ efficiency.

#### Brief Description of the Drawings

Fig. 1 is a perspective view showing a vehicle seat  
 according to the present invention;

Fig. 2 is a cross-sectional taken along line A-A in  
 Fig. 1;

Fig. 3 is a perspective view showing a cushioning  
 material;

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Fig. 4 is a cross-sectional view taken along line B-B in Fig. 3;

Fig. 5 is a cross-sectional view <sup>of</sup> ~~for~~ a main portion of a vehicle seat;

Fig. 6 is an enlarged cross-sectional view <sup>of</sup> ~~for~~ a groove portion;

Fig. 7 is an explanatory view showing a vehicle seat <sup>having</sup> ~~using~~ a vacuum formed skin material;

Fig. 8 is a cross-sectional view taken along line C-C in Fig. 7;

Fig. 9 is a perspective view showing <sup>an</sup> ~~another~~ example ~~for the shape~~ of a seat for use in a motorcycle;

Fig. 10 is <sup>a cross-sectional</sup> ~~an~~ explanatory view <sup>of</sup> ~~showing~~ a prior art <sup>seat</sup> ~~example~~;

Fig. 11 is <sup>a schematic cross-sectional</sup> ~~an~~ explanatory view showing <sup>separation in</sup> a prior art <sup>seat</sup> ~~example~~;

Fig. 12 is <sup>a perspective, partially cut away,</sup> ~~an~~ explanatory view showing a prior art <sup>seat</sup> ~~example~~;

Fig. 13 is <sup>a partial cross-sectional</sup> ~~an~~ explanatory view <sup>of</sup> ~~showing~~ a prior art <sup>seat</sup> ~~example~~;

Fig. 14 is <sup>a partial cross-sectional</sup> ~~an~~ explanatory view showing <sup>the stitching in</sup> a prior art <sup>seat</sup> ~~example~~;

Fig. 15 is <sup>a cross-section of the material of</sup> ~~an~~ explanatory view showing a prior art <sup>seat</sup> ~~example~~; and <sup>a cross-section of the material of another</sup>

Fig. 16 is ~~an~~ explanatory view showing a prior art

*seat*  
[example].

# DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS Preferred Mode of Practicing the Invention

*Figs. 1 and 2 show a preferred embodiment of a vehicle seat*  
[In this embodiment, explanation is to be made to an  
*in the form*  
[example] of a motorcycle seat S [as a vehicle seat].

[A motorcycle seat S of this example is a motorcycle  
[seat] in which a cushioning material 20 is disposed on a  
bottom plate 30, and the cushioning material is covered  
with a skin material 10. [That is, the seat is formed by  
placing a cushioning material 20 on the bottom plate 30,  
covering the cushioning material 20 with the skin material  
10, and securing the peripheral *around* [end] of the skin material  
10 [at the rear face of] the bottom plate 30.

The skin material 10 is [formed] conforming *ed to the* [a sterical]  
shape of the cushioning material 20 by stitching a skin  
material 10a *for the* [including a region of a] seating area and a  
skin material 10b *outside* [not including the region] of *the* a seating  
area, ~~such that the cushioning material 20 may be covered.~~  
A [joining] line 10c is defined *by the joint* [as a joined portion] between  
the skin material 10a including the [region of a] seating  
area and the skin material 10b *surrounding and outside of* [not including a region of]  
the seating area.

[Then, the constitution of the material for the skin]  
[material 10 is to be explained.] Fig. 2 is a cross-  
sectional view taken along A-A in Fig 1. *and shows the* The skin  
material 10 *25* [comprises] a lamination of a PVC layer 12 *at* [on]



the surface, a substrate fabric 13 and a synthetic resin closed-cell cellular synthetic resin 14. That is, the PVC layer 12 and the closed-cell cellular material 14 are laminated with the substrate fabric 13 put therebetween. As described above, closed-cell cellular material 14 is present between the PVC layer 12 and the substrate fabric 13, and the cushioning material 20. The closed-cell cellular material 14 is a crosslinked cellular material, more specifically, a PVC cellular material 14 is used.

The skin material 10 is <sup>covered</sup> applied with a surface treating material 11 and optional embossing is applied to the outside of the skin material 10 to so as to provide a leather-like feeling. Embossing can be applied by using a known pressing machine or embossing machine such as a gravure pressing machine or roll embossing machine, and a concave/convex shape of an embossing plate is <sup>imparted</sup> formed on the seat by heat and pressure.

The surface treating material 11 in this embodiment comprises, more specifically, a vinyl chloride - acrylate copolymer resin or a vinyl chloride - methacrylate copolymer resin.

As the PVC layer 12, PVC and a protein powder of 1 to 40  $\mu\text{m}$  grain size (for example, fine powder of natural protein fiber) compounded together may be used.

The protein powder having a grain size of from 3 to

8  $\mu\text{m}$ , preferably, 4 to 7  $\mu\text{m}$  is used for ensuring uniform dispersion for ~~the~~<sup>3</sup> thickness of the PVC material 11 that forms the surface layer of the skin material 10.

The substrate fabric 13 in this embodiment comprises a knitted material of using nylon yarns, polyester yarns, rayon yarns or <sup>similar</sup> like other synthetic resin yarns.

In this embodiment, an adhesive (urethane-type) (not illustrated) is coated <sup>on</sup> ~~to~~ the surfaces of the substrate fabric 13 in contact with the PVC layer 12 and the closed-cell cellular material 14, respectively, <sup>o</sup> ~~and the~~ <sup>The</sup> substrate fabric 13, ~~and~~ the PVC layer 12, ~~and the substrate fabric~~ <sup>thereby</sup> 13 and the closed-cell cellular material are formed integrally. <sup>together</sup>

In this embodiment, PVC cellular material is used as an example of the closed-cell cellular material but PE foams (polyethylene foams), and PP foams (polypropylene foams) may also be used <sup>instead of</sup> in addition to the PVC cellular material. <sup>provided</sup> Also in this case, <sup>a</sup> the material is constituted as the closed-cell cellular material.

The PVC layer 12, the substrate fabric 13 and the closed-cell cellular material 14 that constitute the skin material 10 can be laminated <sup>together,</sup> not only by the method of coating <sup>with an</sup> the urethane type adhesive, to the substrate fabric <sup>to each other</sup> but also by other known techniques.

For example, each of the layers can be bonded <sup>by</sup> to each other

high frequency welder processing to each other. A predetermined fabrication line can be formed by the high frequency welder processing.

Since the skin material 10 of this embodiment is composed of materials that can be bonded by high frequency welding, such as <sup>2</sup>the surface creating material 11 comprising the vinyl chloride - acrylate copolymer resin or the vinyl chloride - methacrylate copolymer resin, and the PVC layer 12, high frequency welding can be applied easily to portions for joining a plurality of skin materials. Accordingly, it is possible to <sup>join</sup>provide the joined portions with a strength efficiently and reliably. Then, the cushioning material 20 in this embodiment is to be explained. The cushioning material 20 in this embodiment is made of urethane foams. As shown in Fig. 3, a water proof film 21 is appended to the cushioning material 20 at a position <sup>where 2</sup>corresponding to the joined <sup>is to be joined</sup> portion of the skin material 10<sup>v</sup> in this embodiment.

Fig. 4 is a cross-sectional view taken along line B-B in Fig. 3, which illustrates a cross section of the cushioning material 20 to the right of line b-b. As shown in Fig. 4 and Fig. 5, a concave groove 22 is formed on the side of <sup>2</sup>an ridge 23 of the cushioning material 20, at a predetermined position including a joining line 10c along which a skin material 10a and a skin material 10b are

joined from the joining line 10c to a region of the seating area.

Then, the water proof film 21 is <sup>positioned</sup> ~~disposed~~ with the concave groove 22 <sup>serving</sup> ~~being~~ as a guide line. That is, as shown in Fig. 6, the water proof film 21 is cut off <sup>along</sup> ~~at a~~ <sup>position of</sup> the concave groove 22. Thus, the water proof film 21 is ~~disposed~~ <sup>positioned</sup> at an appropriate position on the seating face of the cushioning material 20 without extending <sup>into</sup> ~~to~~ a bonding <sup>interface</sup> ~~face~~ 50 between the skin material 10 and the cushioning material 20. <sup>as will be described</sup> ~~later.~~

In this embodiment, the shape of the concave groove 22 is shown as <sup>having</sup> a substantially V-shaped cross section so that a cutting means such as scissors can be inserted easily <sup>for</sup> ~~upon~~ cutting off the water proof film 22, but the shape of the groove is not <sup>so restricted</sup> ~~restrictive~~ and it may also be a rectangular or substantially U-shaped cross-section.

In this embodiment, when the skin material 10 is covered <sup>over</sup> ~~to~~ the cushioning material 20, they are bonded by an adhesive 40. The adhesive 40 is coated on one or both of the skin material 10 and cushioning material 20 and various types of adhesive may be used.

The adhesive 40 comprises, for example, a hot melt adhesive ~~in the form of an adhesion film, and the hot melt~~ <sup>of the type</sup> adhesive includes those containing active double bonds <sup>and which</sup> ~~in~~

is  
[The adhesive and] hardened <sup>by</sup> under the irradiation [of] UV-rays  
or electron beams, <sup>the type</sup> [those] having epoxy groups and a latent  
curing agent <sup>which</sup> and hardened thermally, <sup>the type</sup> ~~those~~ containing NCO  
groups and Si(OR)<sub>3</sub> groups <sup>which</sup> and hardened <sup>in</sup> under the presence  
of moisture <sup>or the type</sup> [and those] containing SH groups and a metal  
oxide catalyst <sup>which are</sup> and hardened by oxygen. Urethane type  
moisture curing adhesive <sup>s are</sup> is particularly preferred. An  
actual example of the urethane type moisture curing  
adhesive is a moisture curing hot melt adhesive mainly  
comprising a polyester type isocyanate pre-polymer, <sup>which is a</sup> and  
commercially available products, ~~can be used therefor.~~

In this embodiment, a solvent type adhesive may also  
be used as the adhesive 40. As described above since the  
closed-cell cellular material 14 is disposed between the  
PVC layer 12 constituting the skin material 10 and the  
cushioning material 20 [in this embodiment], migration of  
the solvent to the PVC layer 12 is prevented.

In the motorcycle seat S of this embodiment, as  
shown in Fig. 1, the skin material 10 and the cushioning  
material 20 are bonded within a <sup>region</sup> [bonding range] 50 which is  
[a region] inward of the ridge 23 <sup>of</sup> [for] the cushioning  
material 20.

Then, explanation is to be made to the bottom plate  
30.

The bottom plate 30 is molded from a synthetic resin

in this embodiment. On this bottom plate of the synthetic resin, the cushioning material 20 is placed and the cushioning material 20 is covered with the surface material 10 and the periphery ~~end~~ of the skin material 10 is secured to the back of the bottom plate 30. <sup>While the</sup> The bottom plate 30 is made of a synthetic resin in this embodiment, <sup>Other</sup> [but] various [kinds of] materials may be used for the bottom plate.

The periphery ~~end~~ of the skin material 10 can be secured to the bottom plate 30 [by securing the peripheral end of the skin material] with a securing means such as staples, or by applying high frequency welding.

[That is,] since the skin material 10 in the present invention comprises materials that can be welded by high frequency welding such as the surface [treating] material 11 made of a vinyl chloride - acrylate copolymer resin or a vinyl chloride - methacrylate copolymer resin and the PVC material, high frequency welding means such as supersonic welding or radio frequency welding can be used. The periphery of the skin material 10 [treatment for the peripheral end] can be <sup>secured</sup> applied reliably and efficiently by [adopting the] high frequency welding.

In this embodiment, <sup>is used</sup> [the] motorcycle seat <sup>SV</sup> as an example, so that the cushioning material 20 is placed on the bottom plate 30, and the <sup>periphery</sup> [peripheral end] of the skin material is secured to

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However, in other seats the bottom plate 30. In a seat of other constitutions, for example, In a seat for use <sup>on construction</sup> In building machines, the cushioning material is placed on a frame, and the <sup>periphery</sup> peripheral end of the skin material 10 is secured to the frame.

<sup>In the</sup> Then, a method of manufacturing the motorcycle seat S according to the present invention is to be explained.  
At first, an adhesive ~~for bonding the water proof film 21~~ <sup>first</sup> is coated on the cushioning material 20, and the water proof film 21 is appended to the cushioning material 20.

In this embodiment, <sup>with</sup> since the concave groove 22 is formed in the cushioning material 20, the water proof film 21 is cut off <sup>along</sup> at a portion of forming the concave groove 22 with the concave groove 22 as a guide line.

Further, the adhesive is <sup>then</sup> coated on the region 50 inward of the ridge 23 for the seating area of the cushioning material 20. <sup>In casting region 50,</sup> <sup>on</sup> The adhesive 40 is coated to one or both of the skin material 10 and the cushioning material 20.

Finally, the skin material 10 and the cushioning material 20 are press-bonded <sup>together</sup> to cover the cushioning material with the skin material 10, and the ~~peripheral~~ end of the skin material is <sup>fixed by</sup> applied with heat treatment or tack last treatment, to complete the motorcycle seat S.

<sup>Instead of</sup> In addition to the manufacturing method described

as previously described

above, the skin material 10 may be molded <sup>into</sup> a concave/convex shape by vacuum forming and joined to the cushioning material 20. By vacuum forming the skin material 10, the skin material 10 can be provided with the concave/convex shape conveniently.

In the prior art, when a motorcycle seat S having a complicated concave/convex shape is to be formed, a sterical configuration is formed by stitching a plurality of skin materials 110 as shown in Fig. 12 to Fig. 14 [for] to providing the skin material 10 with <sup>3</sup> the concave/convex <sup>shape</sup> [portion] conforming <sup>to</sup> the seat configuration. However, when [the] vacuum forming is adopted, even a motorcycle seat S having a complicated concave/convex shape <sup>can be formed</sup>, for example, as shown in Fig. 9, <sup>with</sup> the skin material 10 [can be] provided with <sup>3</sup> [such] concave/convex shape [simply] conforming <sup>to</sup> the seat configuration.

Fig. 7 shows a motorcycle seat S using a skin material 10 molded by vacuum forming. Fig. 8 is a cross sectional view taken along line C-C in Fig. 7, [which shows] [a cross section of the motorcycle seat S left to line c-c] [in the figure.] As shown in Fig. 8, an adhesive 40 is coated <sup>on</sup> to a skin material 10 molded into a concave/convex shape by vacuum forming, and a cushioning member comprising a cushioning material 20 and a bottom plate 30 <sup>are</sup> is placed under pressure in a mold frame and secured.



Alternatively, [a method of coating an] adhesive 40 [to] <sup>may be coated on</sup>

[a] skin material 10 molded into a concave/convex shape in a mold frame and then charging <sup>the skin</sup> a <sup>ed with</sup> starting material <sup>precursor</sup> for urethane foam and molding the same by <sup>foaming</sup> blowing may be used.

The vacuum formation of the skin material 10 can cope with a cushioning material even if it has an abrupt concave/convex shape thereby enabling [of ensure the] freedom of design and <sup>enabling</sup> high performance.

In the foregoing embodiment, [the explanation has] <sup>motorcycle seat S has</sup> been [made to] a single-seat type motorcycle seat [S as a] [motorcycle seat S], but it may be [used for] a two seat type as shown in Fig. 9, and there is no particular <sup>limitation</sup> restriction <sup>on</sup> for the shape of the seat.

#### [Industrial Applicability]

<sup>The</sup> [According to the] present invention, <sup>offers</sup> the following <sup>advantages</sup> effects can be obtained:

- (1) Since the skin material and the cushioning material constituting the vehicle seat are bonded by [the] adhesive coated <sup>in</sup> [to] the region inward of the ridge <sup>which region constitutes</sup> for the seating area except for the top end of the seat, the skin material is not secured at the ridge which most undergoes the localized load, so that no excessive force <sup>is exerted</sup> exerts on the skin material thereby preventing [occurrence of] flexion or creasing <sup>and providing</sup> to obtain a vehicle seat of favorable appearance.

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(2) Since the skin material is not bonded but left free from the vicinity of the ridge of the cushioning material to <sup>its</sup> ~~the~~ peripheral <sup>edge</sup> ~~end~~, covering to the cushioning material and assembling work such as tack last treatment can be conducted easily to improve the operation efficiency.

(3) Since the concave groove is formed <sup>in</sup> ~~to~~ the cushioning material on the side facing the skin material including the seating area, at a position spaced apart by a predetermined distance from the joining line between the skin material including the seating area and the skin material <sup>outside of</sup> ~~not including~~ the seating area ~~along the joining~~ ~~line~~, the water proof film can be ~~disposed simply at an~~ appropriate <sup>ed</sup> position by disposing the water proof film <sup>under</sup> ~~from~~ the skin material <sup>outside of</sup> ~~not containing~~ the seating area <sup>and extending</sup> to the position <sup>of</sup> ~~for~~ the concave groove with the concave groove <sup>serving as</sup> ~~being~~ as ~~the~~ guide line. <sup>is a laminate which</sup>

(4) The skin material <sup>is a laminate which</sup> comprises the PVC layer, the substrate fabric made of knitted material and the closed-cell cellular synthetic resin <sup>in</sup> ~~laminated~~ successively, and surface <sup>c.f.</sup> ~~treating~~ material <sup>on</sup> ~~the~~ acrylic or vinyl chloride material, is applied <sup>over</sup> ~~to~~ the PVC layer. Since the surface <sup>forms the exterior of</sup> ~~treating~~ material ~~is applied to~~ the skin material, the surface ~~treating~~ material can be embossed to provide a seat surface with a leather-like feeling, to obtain a satisfactory vehicle seat having a <sup>good</sup> ~~grave~~ feeling in view.

of appearance.

(5) When the vinyl chloride - acrylate copolymer resin or the vinyl chloride - methacrylate copolymer resin is used for the surface treatment material, high frequency welding can be applied <sup>to</sup> ~~and~~ bonding of the skin materials to each other and <sup>to</sup> ~~the~~ securing of the peripheral ~~end~~ of the skin material to the bottom plate <sup>can be conducted</sup> reliably and easily.

(6) Since the substrate fabric is disposed in adjacent ~~with~~ the PVC layer, when the skin material is pulled, the tension <sup>is</sup> ~~does~~ not directly exert <sup>ed</sup> on the closed-cell cellular material, thereby <sup>enabling to</sup> prevent <sup>ing</sup> breakage of the closed-cell cellular material.

(8) Since the closed-cell cellular synthetic resin material is present between the PVC layer constituting the skin material and the cushioning material, migration of the plasticizer contained in the PVC layer through the substrate fabric to the cushioning material <sup>is</sup> ~~can be~~ eliminated <sup>and</sup> ~~to prevent~~ degradation of the cushioning material. <sup>prevented</sup>

(9) Since the closed-cell cellular synthetic resin material is present between the PVC layer constituting the skin material and the cushioning material, migration of the plasticizer contained in the PVC layer through the substrate fabric to the cushioning material can be

eliminated to prevent the PVC layer from hardening <sup>due to loss</sup> by the <sup>to preserve the feel of</sup> decrease of the plasticizer and prevent the disadvantage <sup>of</sup> of worsening the feeling upon sitting on the seat.

(10) Since the closed-cell cellular synthetic resin material is present between the PVC layer constituting the skin material and the cushioning material, migration of the amine catalyst contained in the cushioning material to the PVC layer can be eliminated to prevent discoloration and fading of the PVC layer. As described above, it is possible to prevent the disadvantage of deteriorating the aesthetic appearance of the vehicle seat <sup>ion of</sup> <sup>constantly</sup> always exposed externally to the weather.

(11) Since the closed-cell cellular synthetic resin material is present between the PVC layer constituting the skin material and the cushioning material, even if a solvent type adhesive is used for bonding the skin material and the cushioning material, the solvent contained in the adhesive does not migrate to the PVC layer, to prevent discoloration of the PVC layer.

(12) Since the crosslinked cellular material of excellent heat resistance is used for the closed-cell cellular material, it is possible to prevent degradation of the cellular material even when it is exposed to the broiling <sup>temperatures</sup> weather for a long time.

(13) Since the PVC cellular material is used as the

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closed-cell cellular material, a cushioning material having poor water <sup>resistance</sup> proofness, [though being a laminate,] can be covered firmly to ensure weather proofness of the seat and <sup>to</sup> provide the skin material with <sup>a</sup> leather-like feeling.

(14) Since <sup>a</sup> shock-moderating property is obtained by <sup>placing</sup> laminating the cushioning closed-cell cellular material on the cushioning material, it can <sup>provide effects of</sup> moderating <sup>the shock to the</sup> rider's shock upon sitting, and <sup>provide</sup> obtaining high durability with less deterioration caused by abrupt shifting of load upon sitting.

(15) Since [the] protein [material] is contained in the skin material, it provides the surface of the vehicle seat with <sup>a</sup> non-tacky, [and] smooth and fresh feeling. <sup>An</sup> undesirable moistened feeling of the seat during sitting is also eliminated and cleaning <sup>of the</sup> [for the contaminated] seat surface is facilitated. An appropriate gloss can be provided <sup>for</sup> [to] the seat surface to improve the appearance of the seat.

VEHICLE SEAT, A SKIN MATERIAL FOR A VEHICLE SEAT  
AND A METHOD OF MANUFACTURING THE VEHICLE SEAT

BACKGROUND OF THE INVENTION

1. Field of the Invention

5           The present invention concerns a vehicle seat and, particularly, it relates to a vehicle seat used outdoors and a method of manufacturing a vehicle seat, which has good finish, good physical properties, durability and weather resistance and which can be manufactured efficiently, as well as a skin material for the vehicle seat.

2. Statement of the Related Art

10           A vehicle seat has been formed, for example, by disposing a cushioning material on a bottom plate and covering with a skin material. For the vehicle seat, a concave/convex shape has been proposed particularly in view of aesthetics and comfort in riding. For example, a method of using a tack last technique for forming the concave/convex portion and the covering a cushioning material with a skin material by stitching have been used in manufacturing seats of concave/  
15   convex shape.

In the tack last method, as shown in Fig. 10, a concave line is formed to a cushioning material 120 and a skin material 110 is tack lasted by a tack last means (tack last string) 140 to a bottom plate 130.

5 The tack last seat described above involves a problem in that a distinct feeling for the concave/convex shape can not be obtained when the concave line forms a complicated curve (such as an S-shaped curve) or a three dimensional curve, unless many tack last points are set on every turning point of the curve.

10 However, if the number of tack last points is increased in order to overcome the above-described problem, the result is a dimple-like appearance of the outer surface, as well as less efficiency in the assembling operation. Further, since the tack last portions receive concentrated forces, the skin material and the tack last means are sometimes detached.

15 The method of covering a cushioning member 120 with a skin material 110 having the concave/convex shape formed by stitching suffer from the drawback that the skin material 120 and the cushioning material 120 separate at the concave/convex portion, particularly, at the concave portion.

In order to solve the foregoing problem, vehicle seats have been formed by applying an adhesive to the seating area of the cushioning material and bonding the skin material thereto. In

this vehicle seat, the adhesive is applied to predetermined portions including ridges of the cushioning material.

However, when a rider sits on the seat, since the load is concentrated on the ridges of the cushioning material where the skin material is secured, excessive force is exerted on the skin material to undesirably flex or crease the seat.

Further, in covering the cushioning material 120 with the skin material 110, it is necessary to prevent water and dust from entering into the cushioning material 120 where the skin materials 110 are joined to each other by stitching. For this purpose, a water proof film (not illustrated) is disposed between the skin material 110 and the cushioning material 120 at the stitched portions of the skin material 110 to prevent intrusion of rain water or the like.

In using the water proof film described above, it is necessary to dispose the water proof film accurately to prevent water and dust from intruding.

Further, in a vehicle seat formed by covering the cushioning material 120 with the skin material 110 by stitching, since the skin material 110 and cushioning material 120 tend to separate at the concave/convex portions, particularly, at concave portions, in one method an adhesive is applied between the skin material 110 and the cushioning material 120 to prevent separation.



When the adhesive is applied between the skin material 110 and the cushioning material 120, if the water proof film is not disposed at an appropriate position, the water proof film comes into the region of the adhesive and become twisted or the water proof film, if between the adhesive and the skin material 110, interferes with the adhesion between the skin material 110 and the cushioning material 120.

Therefore, it is necessary to accurately cut off the water proof film at exact positions, but the operation while confirming the cut off position is laborious and inefficient.

Further, the vehicle seat is generally formed as an integral cellular molding comprising a skin material, a cushioning material and a bottom plate, for example, a polyvinyl chloride skin material and a polyurethane cellular material.

As shown, for example, in Fig. 15 and Fig. 16, the vehicle seat comprises a skin material 110 and a cushioning material 120, and the skin material 110 includes an acrylic material 111 applied to a synthetic resin 112 or to a synthetic resin 112 laminated on a substrate fabric 113. Then, the skin material 110 is bonded to the surface of the synthetic resin 112 or the substrate fabric 113 using an adhesive 140.

In the prior art described above, if a polyvinyl chloride skin material is used, for example, as the synthetic resin 112, an undesirable vinyl resin-like gloss appears on the surface.

Further, contact between the skin material 110 and the cushioning material 120 results in the following disadvantages.

(1) A plasticizer contained in the synthetic resin 112 migrates to and degrades the cushioning material 120.

5 (2) When a plasticizer contained in the synthetic resin 112 migrates to the cushioning material 120, the amount of the plasticizer contained in the synthetic resin 112 is decreased to make the synthetic resin 112 hard and to worsen the feel upon sitting on the seat.

10 (3) Amine catalyst contained in the cushioning material 120 adversely affects the synthetic resin 112 to cause discoloration or fading of the synthetic resin 112, thereby detracting from the aesthetic appearance of the vehicle seat.

(4) If a solvent type adhesive is used as the adhesive 140 for bonding the skin material 110 to the cushioning material 120, the solvent contained in the adhesive migrates to the synthetic resin 112 to discolor the synthetic resin 112.

15 For overcoming the drawbacks described above, a method has been developed for preventing migration of the plasticizer or the amine catalyst, which method involves placing an amide type resin film or a polyethylene type resin film between the skin material and the

cushioning material, but this method increases the number of components, makes the manufacturing cost expensive and increases the number of steps.

### SUMMARY OF THE INVENTION

5 An object of the present invention is to provide a vehicle seat in which a water proof film is disposed accurately at stitched portions of a skin material covering a cushioning material and reliably preventing water or dust from intruding through the stitched portions of the skin material, as well as to provide a method of manufacturing such a vehicle seat.

10 Another object of the present invention is to provide a vehicle seat with a preferred finish, having high durability and capable of being manufactured efficiently, as well as to provide a method of manufacturing such a vehicle seat.

15 A further object of the present invention is to provide a skin material for use in a vehicle seat having a satisfactory appearance, and capable of preventing a plasticizer contained in the synthetic resin of the skin from migrating into the cushioning material without increasing the number of components or number of steps, thereby preventing an uncomfortable feeling upon sitting on the seat and degradation of the cushioning material.

A further object of the present invention is to provide a skin material for use in a vehicle seat free from the worry of discoloration or fading of the skin material caused by an amine catalyst contained in the cushioning material.

5 A further object of the present invention is to provide a skin material for use in a vehicle seat capable of resisting discoloration by migration of a solvent to the skin material when a solvent type adhesive is used for bonding the skin material to the cushioning material.

A still further object of the present invention is to provide a skin material for use in a vehicle seat that can be bonded by high frequency welding.

10 A still further object of the present invention is to provide a skin material for use in a vehicle seat having a satisfactory leather-like feeling, with no loss of comfort due to abrupt shifting of load when a rider sits on the seat and high resistance to weathering.

In the present specification, "vehicle seat" includes seats for land motorcycles and scooters, as well as snowmobiles and water motorcycles and, further, includes vehicle seats for  
15 tricycle buggy vehicles, mounting vehicles and construction machine seats.

The present invention is to be explained with reference to embodiments based on claims.

Figs. 1 and 2 show a vehicle seat S in accordance with an embodiment of the present invention, as including a cushioning material 20 disposed on a bottom plate 30 and the cushioning material 20 covered with a skin material 10.

The skin material 10 and the cushioning material 20 are bonded with an adhesive 40 coated in a region 50, inward of a ridge 23, which forms a seating area of the cushioning material 20. The adhesive 40 is coated on one or both of the skin material 10 and the cushioning material 20.

When the skin material and the cushioning material are bonded by the adhesive in this way, the adhesive facilitates the assembling of the cushioning material and the skin material.

Further, since the adhesive is coated in a region inward of the ridge for the cushioning material, the skin material is not secured at the ridge portion which receives the most localized load, so that no excessive force is exerted on the skin material, thereby preventing flexion and creasing, and providing a vehicle seat of good appearance.

Further, the skin material 10 is formed by joining a skin material 10a for the seating area and a skin material 10b surrounding the seating area. By stitching of a plurality of skin materials in this way it is possible to form a desired concave/convex shape.

As shown in Figs. 3 and 4, a concave groove 22 is formed along a line 10c joining the skin material 10a and the skin material 10b, on the side of the ridge 23 adjacent the cushioning material 20. Then, a water proof film 21 is disposed between the skin material 10 and the cushioning material 20 and extending from the skin material 10b to the concave groove 22.

5 As described above, in the vehicle seat of this embodiment, since the concave groove is formed at a predetermined position including the joining line on the side of the ridge adjacent the cushioning material, the water proof film can be appropriately positioned by disposing the water proof film against that portion of the skin material which surrounds (excludes) the seating area to the concave groove, with the concave groove serving as a guide line.

10 The skin material 10 comprises a PVC layer 12, a substrate fabric 13 composed of a knitted material and a closed-cell cellular synthetic resin 14, laminated in this order, and an acrylic or vinyl chloride type surface material 11 applied over the PVC layer 12.

15 As described above, since the surface material 11 is disposed on the PVC layer 12, embossing can be applied to the surface material 11, thereby providing the seat surface with a leather-like feel to obtain a satisfactory vehicle seat having good appearance.

When a vinyl chloride-acrylate copolymer resin or a vinyl chloride-methacrylate copolymer resin is used as the surface material 11, high frequency welding can be used to secure

the skin materials 10 to each other or to secure the periphery of the skin material 10 to the bottom plate 30 reliably and easily.

The substrate fabric 13 is a knitted material made of at least one of nylon yarns, polyester yarns and rayon yarns.

5        Since the substrate fabric 13 is disposed adjacent the PVC layer 12, when the skin material 10 is pulled, no direct force is applied to the closed-cell cellular material 14 and breakage of the closed-cell cellular material 14 is thereby prevented.

10       Further, since the closed-cell cellular material 14 is present between the PVC layer 12 of the skin material 10 and the cushioning material 20, the plasticizer contained in the PVC layer 12 migrate through the substrate fabric 13 to the cushioning material 20, thereby preventing degradation of the cushioning material 20.

15       Further, since the closed-cell cellular material 14 is present between the PVC layer 12 and the cushioning material 20, because the plasticizer contained in the PVC layer 12 can not migrate through the substrate fabric 13 to the cushioning material 20, hardening of the PVC layer due to a decrease of the plasticizer is prevented.

Further, since the closed-cell cellular material 14 is present between the PVC layer 12 and the cushioning material 20, an amine catalyst contained in the cushioning material 20 can not migrate into the PVC layer 12 to cause it to discolor or fade. In this way, it is possible to prevent deterioration of the aesthetic appearance of the vehicle seat upon constant exposure to the weather.

Further, since the cellular material 14 with a closed-cell structure is present between the PVC layer 12 and the cushioning material 20, a solvent contained in the adhesive for bonding the skin material 10 to the cushioning material 20 can not migrate into the PVC layer 12 to discolor the PVC layer 12.

The closed-cell cellular material 14 may suitably be a crosslinked cellular material and, more specifically, a PVC cellular material.

Crosslinked cellular material has heat resistance and shows excellent weather resistance when exposed to broiling temperatures for a long period of time.

Further, use of the PVC cellular material as the closed-cell cellular material 14 can reliably cover the cushioning material 20 of poor water resistance, thereby ensuring the weather resistance of the seat. Further, this can provide a satisfactory leather-like feel to the skin material.



Furthermore, since the laminate of the cushioning closed-cell cellular material 14 on the cushioning material 20 moderates impact shock, shocks to the rider are moderated. Furthermore, it prevents degradation by abrupt shifting of load upon sitting provides high durability.

5 The skin material 10 may contain a protein material to give the surface of the vehicle seat a smooth and fresh feeling, rather than a sticky feeling. Further, the protein prevents undesirable moisture on the seat and facilitates cleaning the seat surface. Furthermore, it also provides a moderate gloss to the surface of the seat and thereby improves the aesthetic appearance of the seat.

The method of manufacturing the vehicle seat comprises the following steps.

10 First, an adhesive 40 is coated over an area of the cushioning material 20 inward of ridge 23, i.e., over the seating area. Further, an adhesive 40 is coated on the surface area of skin material 10 which comes into the contact with the region inward of the ridge 23, i.e., with the seating area of the cushioning material 20.

15 Then, the skin material 10 and the cushioning material 20 are press-bonded to cover the cushioning material 20 with the skin material 10.

Alternatively, vacuum forming of skin material 10 may be used, with the coating of an adhesive 40 on the region inward of the ridge 23 (the seating area) of the cushioning material 20. The surface of the skin material 10 is then brought into contact with the adhesive coated region of the cushioning material 20, and then press bonded thereto, thereby covering the cushioning material 20 with the skin material 10.

As described above, by vacuum formation of the skin material, it is possible to cope with even a cushioning material of an abrupt concave/convex shape, thus ensuring freedom of design and performance.

Alternatively, a concave groove 23 may be formed in cushioning material 20 on the side facing skin material 10 and at a predetermined position along joining line 10c for the skin material 10.

Then, a water proof film 21 is attached to the cushioning material 20 and cut off along the concave groove 23.

Then, an adhesive 40 is coated on the surfaces of the cushioning material 20 and the skin material 10 in contact with each other to press-bond the skin material 10 and the cushioning material 20.

As described above, in the method of manufacturing the vehicle seat according to the present invention, a concave groove is formed in the cushioning material, and the water proof film can be disposed at an appropriate position by merely cutting off the water proof film along the concave groove with the concave groove serving as a guide line, to improve efficiency.

### BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a perspective view showing a vehicle seat according to the present invention;

Fig. 2 is a cross-sectional taken along line A-A in Fig. 1;

Fig. 3 is a perspective view showing a cushioning material;

Fig. 4 is a cross-sectional view taken along line B-B in Fig. 3;

Fig. 5 is a cross-sectional view of a main portion of a vehicle seat;

Fig. 6 is an enlarged cross-sectional view of a groove portion;

Fig. 7 is an explanatory view showing a vehicle seat having a vacuum formed skin material;

Fig. 8 is a cross-sectional view taken along line C-C in Fig. 7;

Fig. 9 is a perspective view showing an example of a seat for use in a motorcycle;

Fig. 10 is a cross-sectional view of a prior art seat;

Fig. 11 is a schematic cross-sectional view showing separation in a prior art seat;

Fig. 12 is a perspective view, partially cut away, showing a prior art seat;

Fig. 13 is a partial cross-sectional view of a prior art seat;

Fig. 14 is a partial cross-sectional view of a prior art seat;

Fig. 15 is a cross-section of the material of a prior art seat; and

Fig. 16 is a cross-section of the material of another prior art seat.

### DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

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Figs. 1 and 2 show a preferred embodiment of a vehicle seat in the form of a motorcycle seat S in which a cushioning material 20 is disposed on a bottom plate 30, and the cushioning material is covered with a skin material 10. The seat is formed by placing a cushioning material 20 on the bottom plate 30, covering the cushioning material 20 with the skin material 10, and securing the periphery of the skin material 10 around the bottom plate 30.

The skin material 10 is conformed to the shape of the cushioning material 20 by stitching a skin material 10a for the seating area and a skin material 10b outside of the seating area. A line 10c is defined by the joint between the skin material 10a including the seating area and the skin material 10b surrounding and outside of the seating area.

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Fig. 2 is a cross-sectional view taken along A-A in Fig 1 and shows the skin material 10 as a laminate of a PVC layer 12 at the surface, a substrate fabric 13 and a closed-cell cellular synthetic resin 14. That is, the PVC layer 12 and the closed-cell cellular material 14 are laminated with the substrate fabric 13 therebetween. As described above, closed-cell cellular

material 14 is present between the PVC layer 12 and the substrate fabric 13, and the cushioning material 20. The closed-cell cellular material 14 is a crosslinked cellular material, more specifically, a PVC cellular material.

5 The skin material 10 is covered a surface material 11 and embossing is optionally applied to the outside of the skin material 10 to so as to provide leather-like feeling. Embossing can be by using a known pressing machine or embossing machine such as a gravure pressing machine or roll embossing machine, and a concave/convex shape of an embossing plate is imparted to the seat by heat and pressure.

10 The surface material 11 in this embodiment comprises a vinyl chloride-acrylate copolymer resin or a vinyl chloride-methacrylate copolymer resin.

As the PVC layer 12, PVC and a protein powder of 1 to 40  $\mu\text{m}$  grain size (for example, fine powder of natural protein fiber) compounded together may be used.

15 The protein powder having a grain size of from 3 to 8  $\mu\text{m}$ , preferably, 4 to 7  $\mu\text{m}$  is used for ensuring uniform dispersion for a thickness of the PVC material 11 that forms the surface layer of the skin material 10.

The substrate fabric 13 in this embodiment comprises a knitted material of nylon yarns, polyester yarns, rayon yarns or similar synthetic resin yarns.

In this embodiment, an adhesive (urethane-type) (not illustrated) is coated on the surfaces of the substrate fabric 13 in contact with the PVC layer 12 and the closed-cell cellular material 14, respectively. The substrate fabric 13, the PVC layer 12, and the closed-cell cellular material are thereby formed integrally together.

In this embodiment, PVC cellular material is used as an example of the closed-cell cellular material but PE foams (polyethylene foams) and PP foams (polypropylene foams) may also be used instead of the PVC cellular material, provided the material is a closed-cell cellular material.

The PVC layer 12, the substrate fabric 13 and the closed-cell cellular material 14 that constitute the skin material 10 can be laminated together, not only by the method of coating with an urethane type adhesive, but also by other known techniques.

For example, each of the layers can be bonded to each other by high frequency welder processing. A predetermined fabrication line can be formed by the high frequency welder processing.

Since the skin material 10 of this embodiment is composed of materials that can be bonded by high frequency welding, such as a surface material 11 comprising the vinyl chloride-acrylate copolymer resin or the vinyl chloride-methacrylate copolymer resin, and the PVC layer 12, high frequency welding can be applied easily for joining a plurality of skin materials.

Accordingly, it is possible to join the portions efficiently and reliably.

The cushioning material 20 in this embodiment is made of urethane foam. As shown in Fig. 3, a water proof film 21 is appended to the cushioning material 20 at a position where a portion of the skin material 10 is to be joined in this embodiment.

Fig. 4 is a cross-sectional view taken along line B-B in Fig. 3, which illustrates a cross section of the cushioning material 20 to the right of line b-b. As shown in Fig. 4 and Fig. 5, a concave groove 22 is formed on the side of a ridge 23 of the cushioning material 20, at a predetermined position including a joining line 10c along which a skin material 10a and a skin material 10b are joined from the joining line 10c to a region of the seating area.

Then, the water proof film 21 is positioned with the concave groove 22 serving as a guide line. That is, as shown in Fig. 6, the water proof film 21 is cut off along the concave groove 22. Thus, the water proof film 21 is appropriately positioned on the seating face of the cushioning material 20 without extending into a bonding interface 50 between the skin material 10 and the cushioning material 20.

In this embodiment, the shape of the concave groove 22 is shown as having a substantially V-shaped cross section so that a cutting means such as scissors can be inserted easily for cutting off the water proof film 22, but the shape of the groove is not so restricted and it may also be a rectangular or substantially U-shaped cross-section.

5 In this embodiment, when the skin material 10 is covered over the cushioning material 20, they are bonded by an adhesive 40. The adhesive 40 is coated on one or both of the skin material 10 and cushioning material 20 and various types of adhesive may be used.

10 The adhesive 40 comprises, for example, a hot melt adhesive of the type containing active double bonds and which is hardened by irradiation UV-rays or electron beams, the type having epoxy groups and a latent curing agent which harden thermally, the type containing NCO groups and  $\text{Si(OR)}_3$  groups which harden in the presence of moisture or the type containing SH groups and a metal oxide catalyst which are hardened by oxygen. Urethane type moisture curing adhesives are particularly preferred. An actual example of the urethane type moisture curing adhesive is a moisture curing hot melt adhesive mainly comprising a polyester type isocyanate pre-polymer, which is a commercially available product.

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In this embodiment, a solvent type adhesive may also be used as the adhesive 40. As described above since the closed-cell cellular material 14 is disposed between the PVC layer 12 constituting the skin material 10 and the cushioning material 20, migration of the solvent to the



PVC layer 12 is prevented.

In the motorcycle seat S of this embodiment, as shown in Fig. 1, the skin material 10 and the cushioning material 20 are bonded within a region 50 which is inward of the ridge 23 of the cushioning material 20.

5 The bottom plate 30 is molded from a synthetic resin in this embodiment. On this bottom plate of the synthetic resin, the cushioning material 20 is placed and the cushioning material 20 is covered with the surface material 10 and the periphery of the skin material 10 is secured to the back of the bottom plate 30. While the bottom plate 30 is made of a synthetic resin in this embodiment, various other materials may be used for the bottom plate.

10 The periphery of the skin material 10 can be secured to the bottom plate 30 with a securing means such as staples, or by applying high frequency welding.

Since the skin material 10 in the present invention comprises materials that can be welded by high frequency welding such as the surface material 11 made of a vinyl chloride- acrylate copolymer resin or a vinyl chloride- methacrylate copolymer resin and the PVC material, high  
15 frequency welding means such as supersonic welding or radio frequency welding can be used. The periphery of the skin material 10 can be reliably and efficiently secured by high frequency welding.

In this embodiment, a motorcycle seat S is used as an example, so that the cushioning material 20 is placed on the bottom plate 30, and the periphery of the skin material is secured to the bottom plate 30. However, in other seats, for example, a seat for use on construction machines, the cushioning material is placed on a frame, and the periphery of the skin material 10 is secured to the frame.

In the method of manufacturing the motorcycle seat S according to the present invention, an adhesive is first coated on the cushioning material 20, and the water proof film 21 is appended to the cushioning material 20. In this embodiment, with the concave groove 22 formed in the cushioning material 20, the water proof film 21 is cut off along the concave groove 22 with the concave groove 22 as a guide line.

Adhesive is then coated on the region 50 inward of the ridge 23 for the seating area of the cushioning material 20. In coating region 50, adhesive 40 is coated on one or both of the skin material 10 and the cushioning material 20.

Finally, the skin material 10 and the cushioning material 20 are press-bonded together to cover the cushioning material with the skin material 10, and the periphery of the skin material is fixed by heat treatment or tack last treatment as previously described, to complete the motorcycle seat S.

Instead of the manufacturing method described above, the skin material 10 may be molded into a concave/convex shape by vacuum forming and joined to the cushioning material 20. By vacuum forming the skin material 10, the skin material 10 can be conveniently provided with the concave/convex shape.

5 In the prior art, when a motorcycle seat S having a complicated concave/convex shape is to be formed, a spherical configuration is formed by stitching a plurality of skin materials 110 as shown in Fig. 12 to Fig. 14 to provide the skin material 10 with a concave/convex shape conforming to the seat configuration. However, when vacuum forming is adopted, even a motorcycle seat S having a complicated concave/convex shape can be formed, for example, as shown in Fig. 9, with the skin material 10 provided with a concave/convex shape conforming to the seat configuration.

10 Fig. 7 shows a motorcycle seat S using a skin material 10 molded by vacuum forming. Fig. 8 is a cross sectional view taken along line C-C in Fig. 7. As shown in Fig. 8, an adhesive 40 is coated on a skin material 10 molded into a concave/convex shape by vacuum forming, and a cushioning member comprising a cushioning material 20 and a bottom plate 30 are placed under pressure in a mold frame and secured.

15 Alternatively, adhesive 40 may be coated on skin material 10 molded into a concave/convex shape in a mold frame and then skin then charged with a starting precursor for

urethane foam and molding the same by framing.

The vacuum formation of the skin material 10 can cope with a cushioning material even if it has an abrupt concave/convex shape thereby enabling freedom of design and enabling high performance.

5 In the foregoing embodiment, motorcycle seat S has been described as a single-seat type motorcycle seat, but it may be a two seat type as shown in Fig. 9, and there is no particular limitation on the shape of the seat.

The present invention offers the following advantages:

10 (1) Since the skin material and the cushioning material constituting the vehicle seat are bonded by adhesive coated in the region inward of the ridge, which region constitutes the seating area except for the top end of the seat, the skin material is not secured at the ridge which most undergoes the localized load, so that no excessive force is exerted on the skin material thereby preventing flexion or creasing and providing a vehicle seat of favorable appearance.

15 (2) Since the skin material is not bonded but left free from the vicinity of the ridge of the cushioning material to its peripheral edge, covering to the cushioning material and assembling work such as tack last treatment can be conducted easily to improve the operation efficiency.

(3) Since the concave groove is formed in the cushioning material on the side facing the skin material including the seating area, at a position spaced apart by a predetermined distance from the joining line between the skin material including the seating area and the skin material outside of the seating area, the water proof film can be appropriately positioned by disposing the water proof film under the skin material outside of the seating area and extending to the position of the concave groove with the concave groove serving as a guide line.

(4) The skin material is a laminate which comprises the PVC layer, the substrate fabric made of knitted material and the closed-cell cellular synthetic resin, in succession and surface material, e.g., acrylic or vinyl chloride material, is applied over the PVC layer. Since the surface material forms the exterior of the skin material, the surface material can be embossed to provide a seat surface with a leather-like feel, to obtain a satisfactory vehicle seat having a good appearance.

(5) When the vinyl chloride-acrylate copolymer resin or the vinyl chloride-methacrylate copolymer resin is used for the surface material, high frequency welding can be applied to bond the skin materials to each other and to secure of the periphery of the skin material to the bottom plate reliably and easily.

(6) Since the substrate fabric is disposed adjacent the PVC layer, when the skin material is pulled, the tension is not directly exerted on the closed-cell cellular material, thereby

preventing breakage of the closed-cell cellular material.

(8) Since the closed-cell cellular synthetic resin material is present between the PVC layer constituting the skin material and the cushioning material, migration of the plasticizer contained in the PVC layer through the substrate fabric to the cushioning material is eliminated and degradation of the cushioning material prevented.

(9) Since the closed-cell cellular synthetic resin material is present between the PVC layer constituting the skin material and the cushioning material, migration of the plasticizer contained in the PVC layer through the substrate fabric to the cushioning material can be eliminated to prevent the PVC layer from hardening due to loss of the plasticizer and to preserve the feel of the seat.

(10) Since the closed-cell cellular synthetic resin material is present between the PVC layer constituting the skin material and the cushioning material, migration of the amine catalyst contained in the cushioning material to the PVC layer can be eliminated to prevent discoloration and fading of the PVC layer. As described above, it is possible to prevent deterioration of the aesthetic appearance of a vehicle seat constantly exposed to the weather.

(11) Since the closed-cell cellular synthetic resin material is present between the PVC layer constituting the skin material and the cushioning material, even if a solvent type adhesive is

used for bonding the skin material and the cushioning material, the solvent contained in the adhesive does not migrate to the PVC layer, to discolor the PVC layer.

(12) Since a crosslinked cellular material of excellent heat resistance is used for the closed-cell cellular material, it is possible to prevent degradation of the cellular material even when it is exposed to broiling temperatures for a long time.

(13) Since the PVC cellular material is used as the closed-cell cellular material, a cushioning material having poor water resistance, can be covered firmly to ensure weather proofness of the seat and to provide the skin material with a leather-like feel.

(14) Since a shock-moderating property is obtained by placing the cushioning closed-cell cellular material on the cushioning material, it can moderate shock to the rider and provide high durability with less deterioration caused by abrupt shifting of load upon sitting.

(15) Since protein is contained in the skin material, it provides the surface of the vehicle seat with non-tacky, smooth and fresh feel. An undesirably moist feel of the seat during sitting is also eliminated and cleaning of the seat surface is facilitated. An appropriate gloss can be provided for the seat surface to improve the appearance of the seat.

## ABSTRACT OF THE DISCLOSURE

The vehicle seat of the invention includes a cushioning material having a ridge surrounding and defining a seating area on the cushioning material and a skin material covering the cushioning material. The skin material and cushioning material are bonded together only within the seating area. The skin material is a laminate including, in succession, a PVC layer, a knitted fabric and a closed-cell synthetic resin foam. A water proof film may be interposed between the cushioning material and the skin material outside of the seating area.

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